

CLAIM AMENDMENTS

1. (Currently Amended) An electric discharge machining apparatus comprising:
an tool electrode having a tip end ~~thereof~~ directed ~~to~~ toward a work piece ~~with a~~
voltage ~~being~~ applied between said tool electrode and said work piece ~~to generate~~ generating
a discharge;

a drive shaft connected with said tool electrode;

an electrode driving device having magnetic bearings for moving said drive shaft in
three directions, including a Z-axis direction ~~that~~, which is an axial direction of said drive
shaft, a Y-axis direction that perpendicularly crosses ~~said the~~ the Z-axis direction, and an X-axis
direction that perpendicularly crosses ~~said the~~ the Y-axis direction and ~~said the~~ the Z-axis direction,
by supplying electric current to electromagnetic portions of said magnetic bearings to control
magnetic ~~attractions~~ attraction thereof;

a movable coupling connected with an end of said drive shaft and ~~being~~ movable in
~~said the~~ the three directions; and

an electric motor connected with an end of said coupling for driving said drive shaft
to rotate through said coupling.

2. (Currently Amended) The electric discharge machining apparatus as set forth in
claim 1, wherein said coupling comprises:

a Z direction slider connected with said electric motor disposed above said drive shaft
and ~~being~~ movable in ~~said the~~ the Z-axis direction;

a Y direction slider ~~being~~ movable in ~~said the~~ the Y-axis direction;

an X direction slider ~~being~~ movable ~~in said the~~ the X-axis direction; and

a spring disposed between ~~said one of (i) the~~ one of (i) the Z direction slider and ~~said the~~ the X
direction slider ~~or and (ii) between~~ and (ii) between said Z direction slider, and said Y direction slider for
urging said X direction slider and said Y direction slider toward said electric motor.

3. (Original) The electric discharge machining apparatus as set forth in claim 1,
wherein said coupling comprises a universal joint.

4. (Currently Amended) The electric discharge machining apparatus as set forth in
claim 1, further comprising a transportation unit mounted on said electric motor for moving
said electric motor in ~~said the~~ the three directions.

5. (Currently Amended) An electric discharge machining apparatus comprising:
a tool electrode having a tip end ~~thereof~~ directed ~~to~~ toward a work piece ~~with~~, a voltage ~~being~~ applied between said tool electrode and said work piece ~~to generate~~ generating a discharge;

a drive shaft connected with said tool electrode;

an electrode driving device having magnetic bearings for moving said drive shaft at least in a Z-axis direction, among three directions, including ~~said the~~ the Z-axis direction ~~that~~, which is an axial direction of said drive shaft, a Y-axis direction that perpendicularly crosses ~~said the~~ the Z-axis direction, and an X-axis direction that perpendicularly crosses ~~said the~~ the Y-axis direction and ~~said the~~ the Z-axis direction, by supplying electric current to electromagnetic portions of said magnetic bearings to control magnetic ~~attractions~~ attraction thereof; and

an electric motor for driving said drive shaft to rotate through a rotation transmission mechanism connected with said drive shaft.

6. (Currently Amended) The electric discharge machining apparatus as set forth in claim 1, further comprising a rotation detection unit mounted on said electric motor for detecting rotation information of said drive shaft, wherein ~~the~~ rotation of said drive shaft is controlled by a signal from said rotation detection unit.

7. (Currently Amended) An electric discharge machining apparatus comprising:
a tool electrode having a tip end ~~thereof~~ directed ~~to~~ toward a work piece ~~with~~, a voltage ~~being~~ applied between said tool electrode and said work piece ~~to generate~~ generating a discharge;

a drive shaft connected with said tool electrode;

an electrode driving device having magnetic bearings for moving said drive shaft at least in a Z-axis direction, among three directions, including ~~said the~~ the Z-axis direction ~~that~~, which is an axial direction of said drive shaft, a Y-axis direction that perpendicularly crosses ~~said the~~ the Z-axis direction, and an X-axis direction that perpendicularly crosses ~~said the~~ the Y-axis direction and ~~said the~~ the Z-axis direction, by supplying electric current to electromagnetic portions of said magnetic bearings to control magnetic ~~attractions~~ attraction thereof;

a plurality of ~~bladed~~ blades fixedly secured to said drive shaft; and

a rotation driving conduit having a tip end directed to said blades for guiding fluid ~~to the neighborhood of~~ toward and proximate said blades ~~thereby~~ to spray ~~said the~~ the fluid on said blades ~~so as to~~ and rotate said drive shaft.

In re Appln. of MIYAKE et al.
Application No. Unassigned

8. (Currently Amended) The electric discharge machining apparatus as set forth in claim 7, further comprising a cooling conduit mounted on said electromagnetic portions and having a tip end thereof directed ~~to~~ toward said electromagnetic portions for guiding ~~said the~~ fluid ~~so as~~ to cool said electromagnetic portions.

9. (Currently Amended) The electric discharge machining apparatus as set forth in claim 8, further comprising a fluid cooling system for cooling ~~said the~~ fluid.